ON THE GENERAL SPECTRA OF CERTAIN TYPE-STARS AND THE SPECTRA OF SEVERAL OF THE BRIGHTER STARS IN THE GREEN REGION.

Sir J. N. Lockyer

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SOLAR PHYSICS COMMITTEE.

THE SUN'S SPOTTED AREA

1832—1900.

A Statement of the Mean Daily Area in Each Synodic Rotation of the Sun, Based upon Data Collected at the SOLAR PHYSICS OBSERVATORY, South Kensington.

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THE SUN'S SPOTTED AREA,

1832—1900.

A STATEMENT OF THE MEAN DAILY AREA IN EACH

SYNODIC ROTATION OF THE SUN, BASED UPON

DATA COLLECTED AT THE

SOLAR PHYSICS OBSERVATORY,

SOUTH KENSINGTON.

UNDER THE DIRECTION OF

SIR NORMAN LOCKYER, K.C.B., F.R.S.

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CONTENTS.

INTRODUCTION.

	PAGE
General Remarks	1
Enumeration of Rotations	1
Authorities...	2
Remarks on Unreduced Drawings and Photographs	2
Description of Table I.	3
Description of Table II.	4
Description of Plates	35

TABLES.

Table I.—Mean Daily Area of whole spots on the Sun's disc during each Synodic Rotation from 1832, Jan. 21, to 1900, Dec. 25 ... 5

Table II.—Mean Daily Areas of whole spots for each year from 1832 to 1900 34

Plate I.—Curve showing mean spotted Area per rotation.

Plate II.—Curve showing mean spotted Area per year.

THE SUN'S SPOTTED AREA

1832—1900.

EXPRESSED IN ROTATIONS.

INTRODUCTION.

General Remarks.

The curves representing the variations of solar activity which are in common use are based chiefly upon numbers which express the relative frequency of sun spots, data for the construction of such curves being available for a period of about 130 years. There can be little doubt, however, that a more precise indication of solar changes is afforded by the variation in the total spotted area, but unfortunately data for the determination of areas can only be obtained as far back as 1832. Still, since a little more than six sun spot periods of eleven years can be discussed on the basis of actual area measurements, it seems very desirable that the data available should be collected and systematically stated.

The published results of the reductions of solar photographs which have been made at Greenwich since 1873 include the mean daily areas for each year and for each synodic rotation, the latter being especially valuable in investigations for which a year is too great a unit of time. Similar data are also given by De la Rue in his manuscript reductions of the Kew series of photographs (1862 to 1872), and for this reason it has been decided to adopt a synodic rotation as the unit of time in constructing a new curve on the basis of spotted area. This curve has already been in use for some time at the Solar Physics Observatory, and it is thought that, together with the figures on which it is based, it may prove useful to other workers. The areas throughout are expressed in millionths of the sun's visible hemisphere.

Enumeration of Rotations.

The system of numbering the various rotations of the sun initiated by Carrington was adopted by De la Rue, and also in the Greenwich results.

Rotation I. commences on November 9th, 1853, and for the purpose of this publication the rotations for previous years have been counted backwards as negative numbers. The series thus commences with rotation – 292 (commencing January 21st, 1832) and ends with rotation 631 (ending December 25th, 1900).

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Authorities.

The following is a full statement of the sources of the data on which the tables and curves are based.

1832, January 2nd—1853, December 29th (Rotations − 293 to + 2). The means for the different rotations have been calculated from the daily areas derived by De la Rue and Stewart from Schwabe's drawings, and tabulated in the "First Report of the Solar Physics Committee," pp. 81—101. The original drawings are in the Library of the Royal Astronomical Society.

1854, January 8th—1860, December 26th (Rotations 3 to 96). The means have been calculated from the daily areas derived by De la Rue, Stewart, and Loewy from measurements of Carrington's drawings and published in their "Researches in Solar Physics," 2nd Series (London, 1866). The original drawings are in the Library of the Royal Astronomical Society.

1861, January 1st—1862, February 2nd (Rotations 96 to 111). The daily areas, derived from Schwabe's drawings by De la Rue and Stewart are published in the "First Report of the Solar Physics Committee," pp. 110, 111. They fill a gap between Carrington's series of drawings and the Kew series of photographs.

1862, February 7th—1872, April 9th (Rotations 111 to 247). The rotational means have been taken directly from the De la Rue MSS. relating to the Kew photographs in the possession of the Royal Society.

Breaks in the continuity of the Kew series of photographs have been filled by measurements recently made at the Solar Physics Observatory of the following Ely photographs. The reductions have not been published.

Rotation 125. 1863, February 13, 14, 16, 17, 18, 21, 25, 27. March 3, 4, 5, 7.
„ 126. 1863, March 13, 16, 17, 18, 20, 23, 24, 25, 27, 30. April 1, 2, 7.
„ 127. 1863, April 13, 15, 16, 17, 20, 22, 23, 24, 25, 28. May 1, 2, 5.
„ 150. 1864, December 28. 1865, January 1, 4, 6, 7, 9, 13, 14, 16, 18.
„ 151. 1865, January 23, 24. February 2, 10, 11, 17.
„ 185. 1867, August 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 21, 22, 23, 26, 27, 30. September 1.
„ 186. 1867, September 4, 5, 6, 8, 9. These have been added to the Kew photographs taken later in the same rotation.

1872, April 21st—1873, July 28th (Rotations 248—264). The necessary data were supplied by Prof. Backlund from measurements of the Wilna photographs.

1873, July 28th—1878, January 19th (Rotations 265—324). The means, both for rotations and years, have been taken from the Greenwich observations, 1884.

1878, January 20th—1882, January 4th (Rotations 325—377). The means have been derived from the daily areas of spots for this period published by the Solar Physics Committee (London: Eyre and Spottiswoode, 1901), in which the Greenwich results are incorporated with measurements of Indian and Melbourne photographs, made at the Solar Physics Observatory.

1882, January 5th—1884, December 31 (Rotations 378—417). "Greenwich Spectroscopic and Photographic Results," 1884.

1885, January 1st—1900, December 25th (Rotations 418—631). "Greenwich Spectroscopic and Photographic Results," 1885 and onwards.

Remarks on Unreduced Drawings and Photographs.

For the period 1832 to the end of 1853 the values given in the table may be regarded as final; they depend entirely upon Schwabe's drawings, and no further data are available for reduction; it is satisfactory to note that the average number of days on which observations were secured is no less than 17 per rotation.

For the period 1853 to 1877 inclusive, however, the mean values given in the table are not to be regarded as the most accurate values obtainable, for the reason that some hundreds of drawings by Schwabe, 54 drawings by Carrington, and about

800 photographs taken on days for which there is at present no numerical record of area, have not yet been reduced.

Seeing the immense labour involved in completing the story of the spotted area for every day on which drawings or photographs have been taken, an inquiry has been made as to the probable errors introduced by relying on the numerical data at present at our disposal.

For this purpose measurements of certain unreduced Ely photographs have been made and incorporated with the Kew measurements for the corresponding rotations, the epochs selected being near the minimum of 1866 and the maximum of 1870. The results are indicated in the following table :—

	Rotational Means. Kew.	Rotational Means. Kew and Ely.	Diff.
1866. Rotation 164	809 (7)	775 (9)	34
165	1252 (11)	1317 (13)	65
166	294 (11)	296 (17)	2
1870. Rotation 219	2996 (14)	3156 (16)	160
220	5279 (15)	5272 (19)	7
221	2255 (19)	2239 (22)	16
222	3120 (20)	2992 (23)	128

(In each case the numbers in brackets indicate the number of days of observation.)

If these may be taken as indications of the average effects of including the still unreduced drawings and photographs, it does not seem that the great labour involved in collecting and measuring them would be well repaid.

It has therefore been thought undesirable to postpone the present publication until the whole of the drawings and photographs have been reduced.

From the beginning of 1878, when the Greenwich photographs are supplemented by Indian, Mauritius, and for a time by Melbourne photographs, there are very few days for which there is no photographic record, and although there are still a few unreduced photographs for dates between 1878 and 1884, the mean values given in the tables from 1878 onwards may for all practical purposes be considered final.

It is worthy of remark that during the whole period 1832 to 1900 there is not a single rotation in which no observations have been secured, or for which we have no numerical statement of spotted area.

Description of Table I.

This table gives the mean daily area for each synodic rotation of the sun. The numbers of the rotations are shown in Column I.; Column II. gives the date of com-

mencement of each rotation in Greenwich Civil Time; Column III. the number of days during each rotation on which photographs were taken or drawings made, or the absence of spots noted, and Column IV. the mean daily areas of the spots expressed in millionths of the sun's visible hemisphere. In the case of each spot the area taken was that of the whole spot, including the penumbra. In computing the means, the sum of the daily areas in each rotation has been divided by the number of days on which photographs were obtained in the corresponding period, or by the number of days on which photographs were taken, *plus* the number of days on which the absence of spots was recorded.

Description of Table II.

For some investigations a year is a convenient unit of time, and accordingly the mean daily area for each year prior to 1873 has been calculated for connecting up with the Greenwich series. The Greenwich means for 1878—1881 have been revised, by including the Kensington reductions of Indian and Melbourne photographs to which reference has already been made.

The means for exact periods of a year are not given by De la Rue in the case of the Kew series, but by reference to his tables of daily areas the necessary corrections have been made; the measurements of Ely photographs measured to fill gaps in the Kew series have been combined with the Kew results in the computation of the annual means. The means throughout have been obtained in the usual manner by dividing the sum of the daily areas during the year by the number of days of observation. The results are given in the accompanying table.

I am greatly indebted to the President and the Council of the Royal Society for permission to utilise some of the data contained in the De la Rue manuscripts in the Society's possession; and to Dr. Backlund, of Pulkowa, for so kindly responding to a request for measurements of photographs to fill a break of more than a year between the end of the Kew series and the beginning of the Greenwich series of photographs.

Mr. A. Fowler, Assistant Professor of Physics, and Mr. A. E. Hodgson, Teacher in Training in Astronomical Physics at The Royal College of Science, are responsible for the reduction of the Ely photographs, and with the assistance of Mr. H. Shaw, also a Teacher in Training, have prepared the tables and curves for the present publication.

NORMAN LOCKYER.

TABLE I.

MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 292	1832 Jan. 21	11	296
– 291	Feb. 17	17	703
– 290	Mar. 15	12	612
– 289	April 12	17	243
– 288	May 9	20	681
– 287	June 5	8	426
– 286	July 2	20	134
– 285	July 30	24	66
– 284	Aug. 26	21	85
– 283	Sept. 22	21	51
– 282	Oct. 19	13	162
– 281	Nov. 16	13	198
– 280	Dec. 13	11	71
– 279	1833 Jan. 9	15	133
– 278	Feb. 6	16	177
– 277	Mar. 5	11	98
– 276	April 1	21	14
– 275	April 29	20	36
– 274	May 26	20	0
– 273	June 22	16	51
– 272	July 19	18	9
– 271	Aug. 15	18	25
– 270	Sept. 12	9	93
– 269	Oct. 9	20	90
– 268	Nov. 5	19	64
– 267	Dec. 3	8	88
– 266	Dec. 30	11	14
– 265	1834 Jan. 26	12	333
– 264	Feb. 23	20	30
– 263	Mar. 22	17	14

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 262	1834 April 18	24	1
– 261	May 15	19	38
– 260	June 12	14	140
– 259	July 9	14	32
– 258	Aug. 5	20	8
– 257	Sept. 1	12	166
– 256	Sept. 28	18	172
– 255	Oct. 26	14	274
– 254	Nov. 22	9	240
– 253	Dec. 19	16	311
– 252	1835 Jan. 16	16	176
– 251	Feb. 12	11	329
– 250	Mar. 10	14	307
– 249	April 8	13	1011
– 248	May 5	15	485
– 247	June 1	11	595
– 246	June 28	9	864
– 245	July 26	4	942
– 244	Aug. 22	3	1540
– 243	Sept. 18	17	1044
– 242	Oct. 15	12	946
– 241	Nov. 12	11	1310
– 240	Dec. 9	6	870
– 239	1836 Jan. 5	15	1058
– 238	Feb. 1	10	1630
– 237	Feb. 29	13	1001
– 236	Mar. 27	13	1561
– 235	April 23	14	1339
– 234	May 20	16	1436
– 233	June 17	10	1369
– 232	July 1	13	1334
– 231	Aug. 10	15	1182
– 230	Sept. 6	11	786

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of whole Spots.
– 229	1836 Oct. 4	10	1761
– 228	Oct. 31	12	1560
– 227	Nov. 27	4	2230
– 226	Dec. 25	5	2220
– 225	1837 Jan. 21	11	2015
– 224	Feb. 17	9	1594
– 223	Mar. 16	8	1143
– 222	April 13	14	765
– 221	May 10	9	932
– 220	June 5	18	1175
– 219	July 3	7	960
– 218	July 31	8	642
– 217	Aug. 27	15	969
– 216	Sept. 23	17	753
– 215	Oct. 21	11	1328
– 214	Nov. 17	6	804
– 213	Dec. 14	11	1891
– 212	1838 Jan. 10	8	1099
– 211	Feb. 7	19	1274
– 210	Mar. 6	9	862
– 209	April 2	13	873
– 208	April 29	16	1010
– 207	May 27	15	938
– 206	June 23	22	700
– 205	July 20	12	762
– 204	Aug. 17	16	792
– 203	Sept. 13	19	527
– 202	Oct. 10	14	822
– 201	Nov. 6	14	563
– 200	Dec. 4	12	574
– 199	Dec. 31	13	830
– 198	1839 Jan. 27	11	1098
– 197	Feb. 24	13	878

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 196	1839 Mar. 23	13	437
– 195	April 19	16	632
– 194	May 16	17	553
– 193	June 13	18	643
– 192	July 10	21	681
– 191	Aug. 6	10	1199
– 190	Sept. 2	18	1318
– 189	Sept. 30	13	881
– 188	Oct. 27	8	510
– 187	Nov. 23	9	416
– 186	Dec. 21	13	613
– 185	1840 Jan. 17	15	840
– 184	Feb. 13	13	677
– 183	Mar. 11	18	655
– 182	April 8	21	530
– 181	May. 5	18	628
– 180	June 1	25	487
– 179	June 28	22	341
– 178	July 26	18	510
– 177	Aug. 22	20	879
– 176	Sept. 18	17	481
– 175	Oct. 16	19	718
– 174	Nov. 12	15	477
– 173	Dec. 9	16	516
– 172	1841 Jan. 5	14	203
– 171	Feb. 2	18	201
– 170	Mar. 1	19	175
– 169	Mar. 28	19	350
– 168	April 24	25	673
– 167	May 22	20	532
– 166	June 18	21	414
– 165	July 15	24	158
– 164	Aug. 12	26	329

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued*.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 163	1841 Sept. 8	22	510
– 162	Oct. 5	13	210
– 161	Nov. 1	19	167
– 160	Nov. 29	13	491
– 159	Dec. 26	14	215
– 158	1842 Jan. 22	18	215
– 157	Feb. 19	19	143
– 156	Mar. 18	23	176
– 155	April 14	24	174
– 154	May 11	26	125
– 153	June 8	25	290
– 152	July 5	25	48
– 151	Aug. 1	26	254
– 150	Aug. 28	24	214
– 149	Sept. 25	17	277
– 148	Oct. 22	18	490
– 147	Nov. 18	16	203
– 146	Dec. 15	15	115
– 145	1843 Jan. 11	20	118
– 144	Feb. 8	12	78
– 143	Mar. 7	25	10
– 142	April 4	23	134
– 141	May 1	22	233
– 140	May 27	21	144
– 139	June 24	24	31
– 138	July 21	27	95
– 137	Aug. 18	23	84
– 136	Sept. 14	24	50
– 135	Oct. 11	24	44
– 134	Nov. 7	18	194
– 133	Dec. 5	11	29
– 132	1844 Jan. 1	20	123
– 131	Jan. 28	19	120

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 130	1844 Feb. 25	16	182
– 129	Mar. 23	21	64
– 128	April 19	25	297
– 127	May 17	22	94
– 126	June 13	23	133
– 125	July 10	22	366
– 124	Aug. 6	21	227
– 123	Sept. 2	25	50
– 122	Sept. 30	18	203
– 121	Oct. 27	18	73
– 120	Nov. 23	16	160
– 119	Dec. 21	17	466
– 118	1845 Jan. 17	12	287
117	Feb. 13	18	708
– 116	Mar. 13	16	630
– 115	April 9	22	710
– 114	May 6	21	331
– 113	June 2	17	433
– 112	June 30	17	208
– 111	July 27	19	294
– 110	Aug. 23	11	246
– 109	Sept. 19	18	227
– 108	Oct. 17	15	354
– 107	Nov. 13	13	272
– 106	Dec. 10	14	561
– 105	1846 Jan. 5	15	577
– 104	Feb. 2	17	85[illegible]
– 103	Mar. 2	13	1[illegible]8
– 102	Mar. 29	13	804
– 101	April 26	14	670
– 100	May 23	17	700
– 99	June 19	18	336
– 98	July 16	22	370

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 97	1846 Aug. 13	20	775
– 96	Sept. 9	19	858
– 95	Oct. 6	14	304
– 94	Nov. 2	14	426
– 93	Nov. 30	11	758
– 92	Dec. 27	6	314
– 91	1847 Jan. 23	8	1323
– 90	Feb. 20	13	1330
– 89	Mar. 19	18	733
– 88	April 15	23	398
– 87	May 12	21	413
– 86	June 9	20	862
– 85	July 6	22	347
– 84	Aug. 2	23	1366
– 83	Aug. 29	16	1720
– 82	Sept. 26	15	1738
– 81	Oct. 23	15	1566
– 80	Nov. 19	18	1217
– 79	Dec. 17	9	1542
– 78	1848 Jan. 13	12	1050
– 77	Feb. 9	10	1069
– 76	Mar. 7	17	656
– 75	April 3	16	470
– 74	April 30	24	1122
– 73	May 28	22	866
– 72	June 24	19	1184
– 71	July 21	22	998
– 70	Aug. 17	18	815
– 69	Sept. 13	20	1153
– 68	Oct. 11	13	1015
– 67	Nov. 7	12	626
– 66	Dec. 4	21	1334
– 65	1849 Jan. 1	11	1568

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 64	1849 Jan. 28	11	1124
– 63	Feb. 24	14	738
– 62	Mar. 23	14	1113
– 61	April 20	16	885
– 60	May 17	23	720
– 59	June 13	18	633
– 58	July 10	20	640
– 57	Aug. 7	25	470
– 56	Sept. 3	20	613
– 55	Sept. 30	18	625
– 54	Oct. 27	16	700
– 53	Nov. 24	11	588
– 52	Dec. 21	6	765
– 51	1850 Jan. 20	14	536
– 50	Feb. 14	13	748
– 49	Mar. 14	20	395
– 48	April 10	16	369
47	May 8	19	400
– 46	June 4	21	605
– 45	July 1	22	417
– 44	July 28	25	448
– 43	Aug. 24	23	517
– 42	Sept. 21	20	710
– 41	Oct. 18	9	220
– 40	Nov. 14	10	507
– 39	Dec. 12	13	383
– 38	1851 Jan. 8	14	921
– 37	Feb. 4	15	1064
– 36	Mar. 4	17	872
– 35	Mar. 31	15	670
– 34	April 27	22	184
– 33	May 24	23	556
– 32	June 21	18	558

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
– 31	1851 July 18	23	417
– 30	Aug. 14	22	698
– 29	Sept. 10	13	612
– 28	Oct. 8	17	621
– 27	Nov. 4	11	584
– 26	Dec. 2	9	679
– 25	Dec. 29	13	809
– 24	1852 Jan. 25	16	717
– 23	Feb. 21	19	642
– 22	Mar. 19	20	844
– 21	April 16	23	501
– 20	May 13	25	608
– 19	June 9	24	322
– 18	July 6	25	350
– 17	Aug. 3	20	341
– 16	Aug. 30	22	442
– 15	Sept. 26	22	537
– 14	Oct. 23	15	712
– 13	Nov. 20	14	490
– 12	Dec. 17	23	615
– 11	1853 Jan. 13	6	259
– 10	Feb. 10	13	359
– 9	Mar. 9	16	529
– 8	April 5	15	432
– 7	May 3	23	408
– 6	May 30	18	678
– 5	June 26	24	510
– 4	July 23	23	327
– 3	Aug. 19	24	489
– 2	Sept. 16	21	369
– 1	Oct. 13	19	380
1	Nov. 9	9	152
2	Dec. 7	11	203

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
3	1854 Jan. 3	9	16
4	Jan. 30	12	220
5	Feb. 27	13	188
6	Mar. 26	10	199
7	April 22	10	85
8	May 19	12	13
9	June 16	12	149
10	July 13	18	122
11	Aug. 9	19	36
12	Sept. 5	17	201
13	Oct. 3	6	1
14	Oct. 30	9	360
15	Nov. 26	7	170
16	Dec. 24	10	623
17	1855 Jan. 20	9	378
18	Feb. 16	15	122
19	Mar. 15	14	6
20	April 12	20	14
21	May 9	10	1
22	June 4	22	5
23	July 2	21	0
24	July 30	23	12
25	Aug. 26	19	0
26	Sept. 22	16	9
27	Oct 20	11	16
28	Nov 16	11	61
29	Dec. 13	17	2
30	1856 Jan. 9	12	0
31	Feb. 6	7	25
32	Mar. 4	15	0
33	Mar. 31	17	13
34	April 27	17	0
35	May 25	17	16

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
36	1856 June 21	19	0
37	July 18	24	35
38	Aug. 15	19	154
39	Sept. 11	17	3
40	Oct. 8	8	5
47	Nov. 4	21	21
42	Dec. 2	14	395
43	Dec. 29	14	89
44	1857 Jan. 25	16	67
45	Feb. 22	22	5
46	Mar. 21	16	130
47	April 17	17	223
48	May 14	20	390
49	June 11	21	79
50	July 8	23	191
51	Aug. 4	22	107
52	Aug. 31	17	535
53	Sept. 28	15	449
54	Oct. 25	11	230
55	Nov. 21	8	49
56	Dec. 19	10	1101
57	1858 Jan. 15	16	486
58	Feb. 11	8	698
59	Mar. 10	15	843
60	April 7	14	272
61	May 4	13	364
62	May 31	18	599
63	June 27	14	642
64	July 25	7	338
65	Aug. 21	7	1191
66	Sept. 17	5	1056
67	Oct. 15	5	1249
68	Nov. 11	5	1648

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
69	1858 Dec. 8	5	1192
70	1859 Jan. 4	4	2305
71	Feb. 1	2	776
72	Feb. 28	10	1053
73	Mar. 27	5	406
74	April 23	3	1290
75	May 21	6	789
76	June 17	7	479
77	July 14	6	2973
78	Aug. 11	7	2062
79	Sept. 7	4	1654
80	Oct. 4	3	1920
81	Oct. 31	7	1445
82	Nov. 28	4	1367
83	Dec. 25	7	664
84	1860 Jan. 21	13	1373
85	Feb. 18	14	1319
86	Mar. 16	13	497
87	April 12	18	788
88	May 9	11	941
89	June 6	10	1477
90	July 3	16	1740
91	July 30	12	2193
92	Aug. 26	18	1123
93	Sept. 23	13	1507
94	Oct. 20	14	1347
95	Nov. 16	10	1860
96	Dec. 13·54	12	1226
97	1861 Jan. 8·88	9	628
98	Feb. 6·22	15	1332
99	Mar. 5·55	17	1633
100	April 1·86	23	1848
101	April 29·12	16	1044

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
102	1861 May 26·34	21	1605
103	June 22·55	18	1576
104	July 19·75	22	1027
105	Aug. 15·97	20	1220
106	Sept. 12·22	17	1333
107	Oct. 9·50	19	1088
108	Nov. 5·79	19	1286
109	Dec. 3·01	13	1558
110	Dec. 30·43	7	799
111	1862 Jan. 26·77	6	1041
112	Feb. 23·10	7	970
113	Mar. 22·42	10	638
114	April 18·70	20	977
115	May 15·94	17	1795
116	June 12·14	17	1932
117	July 9·34	21	2458
118	Aug. 5·55	16	1073
119	Sept. 1·79	15	1333
120	Sept. 29·06	13	927
121	Oct. 26·36	6	849
122	Nov. 22·66	7	550
123	Dec. 19·98	7	1472
124	1863 Jan. 16·32	7	699
125	Feb. 12·66	12	1000
126	Mar. 11·96	13	1210
127	April 8·25	13	913
128	May 5·50	13	863
129	June 1·75	16	479
130	June 28·95	19	562
131	July 26·15	19	517
132	Aug. 22·38	13	49
133	Sept. 18·64	15	479
134	Oct. 15·92	9	337

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC *—continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
135	1863 Nov. 12·23	10	496
136	Dec. 9·54	11	1155
137	1864 Jan. 5·88	4	1590
138	Feb. 2·23	5	794
139	Feb. 29·58	10	1280
140	Mar. 27·88	18	426
141	April 24·15	17	623
142	May 21·38	14	1121
143	June 17·58	16	960
144	July 14·78	17	812
145	Aug. 11·00	13	1108
146	Sept. 7·24	14	129
147	Oct. 4·52	14	277
148	Oct. 31·81	5	908
149	Nov. 28·12	8	1304
150	Dec. 25·45	10	258
151	1865 Jan. 21·78	6	1295
152	Feb. 18·13	8	346
153	Mar. 17·45	19	334
154	April 13·74	12	195
155	May 10·98	15	515
156	June 7·19	9	436
157	July 4·38	12	119
158	July 31·58	13	364
159	Aug. 27·83	19	429
160	Sept. 24·10	17	765
161	Oct. 21·38	9	208
162	Nov. 17·69	6	394
163	Dec. 15·01	9	741
164	1866 Jan. 11·34	7	809
165	Feb. 7·68	11	1252
166	Mar. 7·01	11	294
167	April 3·31	16	176

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC *continued.*

No. of Rotation.	Date of Commencement of each Rotation.			No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
168	1866	April	30·57	20	164
169		May	27·79	7	315
170		June	23·99	15	175
171		July	21·19	6	165
172		Aug.	17·42	10	226
173		Sept.	13·67	10	139
174		Oct.	10·95	12	125
175		Nov.	7·25	10	97
176		Dec.	4·57	4	0
177		Dec.	31·90	5	0
178	1867	Jan.	28·24	10	0
179		Feb.	24·56	5	11
180		Mar.	23·89	15	108
181		April	20·16	14	3
182		May	17·39	12	136
183		June	13·60	11	51
184		July	10·80	15	2
185		Aug.	7·02	19	35
186		Sept.	3·26	14	671
187		Sept.	30·53	10	48
188		Oct.	27·82	8	164
189		Nov.	24·12	8	187
190		Dec.	21·45	2	411
191	1868	Jan.	17·78	7	26
192		Feb.	14·13	8	432
193		Mar.	12·45	13	561
194		April	8·75	12	917
195		May	6·00	18	330
196		June	2·21	16	108
197		June	29·41	19	302
198		July	26·61	17	473
199		Aug.	22·84	8	428
200		Sept.	19·10	13	340

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.			No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
201	1868	Oct.	16·39	14	583
202		Nov.	12·69	4	749
203		Dec.	10·01	15	691
204	1869	Jan.	6·34	13	966
205		Feb.	2·69	13	622
206		Mar.	2·01	10	883
207		Mar.	29·32	15	630
208		April	25·59	16	1838
209		May	22·82	17	1740
210		June	19·02	17	796
211		July	16·22	15	555
212		Aug.	12·43	19	947
213		Sept.	8·68	17	743
214		Oct.	5·96	15	502
215		Nov.	2·26	10	885
216		Nov.	30·57	9	1634
217		Dec.	26·89	9	1453
218	1870	Jan.	23·23	7	3501
219		Feb.	19·57	14	2996
220		Mar.	18·89	15	5279
221		April	15·18	19	2255
222		May	12·42	20	3120
223		June	8·62	18	1742
224		July	5·82	15	1236
225		Aug.	2·03	19	2410
226		Aug.	29·27	19	3568
227		Sept.	25·54	17	2890
228		Oct.	22·82	14	3030
229		Nov.	19·13	9	2405
230		Dec.	16·45	10	1205
231	1871	Jan.	12·79	9	1015
232		Feb.	9·12	20	3107
233		Mar.	8·46	22	3212

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.			No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
234	1871	April	7·46	18	3388
235		May	2·01	19	2429
236		May	29·23	18	1000
237		June	25·43	22	1512
238		July	22·63	19	2249
239		Aug.	18·86	16	1020
240		Sept.	15·11	14	1130
241		Oct.	12·39	9	1453
242		Nov.	8·69	14	1290
243		Dec.	6.01	1	1041
244	1872	Jan.	2·33	9	1228
245		Jan.	29·68	13	1795
246		Feb.	26·01	12	821
247		Mar.	24·33	3	672
248		April	21·1	6	1432
249		May	18·3	12	1686
250		June	14·5	7	1530
251		July	11·7	14	1726
252		Aug.	7·9	5	1870
253		Sept.	3·2	2	1502
254		Sept.	30·9	3	1398
255		Oct.	28·7	4	950
256		Nov.	25·0	3	1882
257		Dec.	22·4	1	1532
258	1873	Jan.	18·7	7	1662
259		Feb.	15·0	4	1668
260		Mar.	14·4	12	1166
261		April	10·7	4	608
262		May	7·9	6	262
263		June	4·1	12	450
264		July	1·9	10	452
265		July	28·59	14	942
266		Aug.	24·82	14	583

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
267	1873 Sept. 21·09	16	767
268	Oct. 18·37	4	535
269	Nov. 14·67	6	404
270	Dec. 11·99	5	583
271	1874 Jan. 8·32	2	1172
272	Feb. 4·66	3	392
273	Mar. 4·00	7	379
274	Mar. 31·30	14	352
275	April 27·56	17	597
276	May 24·79	13	243
277	June 20·99	20	1072
278	July 18·19	14	1175
279	Aug. 14·42	20	566
280	Sept. 10·67	14	788
281	Oct. 7·95	13	242
282	Nov. 4·23	14	458
283	Dec. 1·55	7	141
284	Dec. 28·88	5	207
285	1875 Jan. 25·21	11	177
286	Feb. 21·55	11	589
287	Mar. 20·87	14	370
288	April 17·16	20	452
289	May 14·39	16	176
290	June 10·60	16	490
291	July 7·80	13	147
292	Aug. 4·01	12	150
293	Aug. 31·26	10	40
294	Sept. 27·51	15	75
295	Oct. 24·81	11	182
296	Nov. 21·11	5	378
297	Dec. 18·42	4	72
298	1876 Jan. 14·76	12	333
299	Feb. 11·11	15	257

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
300	1876 Mar. 9·44	20	242
301	April 5·74	17	10
302	May 2·99	18	55
303	May 30·21	11	4
304	June 26·41	15	64
305	July 23·61	14	33
306	Aug. 19·84	10	29
307	Sept. 16·09	12	127
308	Oct. 13·35	7	147
309	Nov. 9·67	7	130
310	Dec. 6·99	2	334
311	1877 Jan. 3·32	6	125
312	Jan. 30·66	8	71
313	Feb. 27·00	10	88
314	Mar. 26·31	12	90
315	April 22·58	15	116
316	May 19·81	16	101
317	June 16·02	19	15
318	July 13·22	12	7
319	Aug. 9·43	17	54
320	Sept. 5·68	14	77
321	Oct. 2·95	13	0
322	Oct. 30·24	15	338
323	Nov. 26·55	8	159
324	Dec. 23·87	10	8
325	1878 Jan. 20·21	18	20
326	Feb. 16·55	28	26
327	Mar. 15·88	26	23
328	April 12·17	25	0
329	May 9·42	26	84
330	June 5·63	27	23
331	July 2·82	26	0
332	July 30·03	23	0

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.			No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
333	1878	Aug.	26·27	26	60
334		Sept.	22·53	27	0
335		Oct.	19·81	28	17
336		Nov.	16·12	27	3
337		Dec.	13·43	28	1
338	1879	Jan.	9·77	26	1
339		Feb.	6·11	25	0
340		Mar.	5·44	28	0
341		April	1·75	25	60
342		April	29·01	23	6
343		May	26·23	23	0
344		June	22·44	18	81
345		July	19·64	15	24
346		Aug.	15·86	18	60
347		Sept.	12·11	24	20
348		Oct.	9·39	18	79
349		Nov.	5·68	15	92
350		Dec.	2·99	25	39
351		Dec.	30·32	25	279
352	1880	Jan.	26·66	27	343
353		Feb.	23·00	27	179
354		Mar.	21·32	25	111
355		April	17·60	27	385
356		May	14·84	27	301
357		June	10·04	24	539
358		July	8·24	23	244
359		Aug.	4·45	25	754
360		Aug.	31·69	26	900
361		Sept.	27·96	27	727
362		Oct.	25·25	27	231
363		Nov.	21·56	26	636
364		Dec.	18·88	25	418
365	1881	Jan.	15·21	26	776

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
366	1881 Feb. 11·56	26	408
367	Mar. 10·88	28	766
368	April 7·18	26	481
369	May 4·44	27	383
370	May 31·65	23	587
371	June 27·85	25	810
372	July 25·06	25	775
373	Aug. 21·28	24	1103
374	Sept. 17·54	27	614
375	Oct. 14·82	28	585
376	Nov. 11·12	26	1150
377	Dec. 8·44	26	476
378	1882 Jan. 4·77	22	400
379	Feb. 1·11	26	691
380	Feb. 28·45	27	952
381	Mar. 27·76	27	1941
382	April 24·03	26	1688
383	May 21·26	27	582
384	June 17·46	24	505
385	July 14·66	23	495
386	Aug. 10·88	24	865
387	Sept. 7·12	25	1202
388	Oct. 4 40	27	1296
389	Oct. 31·69	27	2016
390	Nov. 28·00	28	411
391	Dec. 25·32	26	974
392	1883 Jan. 21·66	25	794
393	Feb. 18·00	26	302
394	Mar 17·33	28	1073
395	April 13·62	26	755
396	May 10·86	26	596
397	June 7·07	27	1563
398	July 4·27	20	2037

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.			No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
399	1883	July	31·47	25	551
400		Aug.	27·71	23	1589
401		Sept.	23·97	27	1478
402		Oct.	21·26	27	1606
403		Nov.	17·56	25	1305
404		Dec.	14·88	24	1918
405	1884	Jan.	11·22	25	1716
406		Feb.	7·56	23	1434
407		Mar.	5·89	25	1181
408		April	2·19	25	1651
409		April	29·45	26	1184
410		May	26·68	19	795
411		June	22·88	17	661
412		July	20·08	21	757
413		Aug.	16·30	24	646
414		Sept.	12·55	22	1477
415		Oct.	9·83	26	760
416		Nov.	6·13	26	469
417		Dec.	3.44	26	852
418		Dec.	31·27	25	472
419	1885	Jan.	26·11	27	1181
420		Feb.	22·45	28	803
421		Mar.	22·76	27	791
422		April	18·04	26	844
423		May	15·27	27	1272
424		June	12·47	26	1712
425		July	9·67	26	935
426		Aug.	5·89	22	680
427		Sept.	2·13	28	633
428		Sept.	29·40	27	666
429		Oct.	26·70	27	620
430		Nov.	23·01	28	120
431		Dec.	20·33	26	655

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
432	1886 Jan. 16·66	26	348
433	Feb. 13·00	28	766
434	Mar. 12·33	27	800
435	April 8·63	27	745
436	May 5·88	27	459
437	June 2·09	27	370
438	June 29·29	28	397
439	July 26·49	27	205
440	Aug. 22·72	27	206
441	Sept. 18·98	28	69
442	Oct. 16·27	27	27
443	Nov. 12·57	27	2
444	Dec. 9·89	27	232
445	1887 Jan. 6·22	26	90
446	Feb. 2·56	27	72
447	Mar. 1·87	27	28
448	Mar. 29·20	27	35
449	April 25·47	26	309
450	May 22·70	27	290
451	June 18·90	27	352
452	July 16·10	27	255
453	Aug. 12·32	28	54
454	Sept. 8·57	27	141
455	Oct. 6·84	27	53
456	Nov. 2·14	28	56
457	Nov. 29·45	27	644
458	Dec. 26·77	26	145
459	1888 Jan. 23·11	27	15
460	Feb. 19·45	26	157
461	Mar. 17·77	27	34
462	April 14·06	26	26
463	May 11·30	28	206
464	June 7·51	27	36

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.			No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
465	1888	July	4·71	27	25
466		July	31·91	27	20
467		Aug.	28·15	28	152
468		Sept.	24·42	27	8
469		Oct.	21·70	27	206
470		Nov.	18·01	26	143
471		Dec.	15·33	26	23·9
472	1889	Jan.	11·66	26	16·6
473		Feb.	8·00	27	20·0
474		Mar.	7·34	27	37·8
475		April	3·64	27	18·7
476		April	30·90	27	16·6
477		May	28·12	27	160
478		June	24·31	27	214
479		July	21·52	25	345
480		Aug.	17·74	27	101
481		Sept.	14·00	27	58·6
482		Oct.	11·28	28	1·9
483		Nov.	7·58	27	0·0
484		Dec.	4·89	27	76·3
485	1890	Jan.	1·19	28	45·3
486		Jan.	28·54	27	2·2
487		Feb.	24·87	26	83·7
488		Mar.	24·19	28	5·5
489		April	20·47	27	23·0
490		May	17·70	27	17·1
491		June	13·90	27	68·4
492		July	11·10	26	115
493		Aug.	7·31	28	241
494		Sept.	3·56	26	160
495		Sept.	30·83	27	247
496		Oct.	28·12	28	96·9
497		Nov.	24·43	26	224

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
498	1890 Dec. 21·75	27	58·3
499	1891 Jan. 18·09	26	240
500	Feb. 14·43	27	270
501	Mar. 13·76	27	225
502	April 10·05	27	370
503	May 7·30	27	596
504	June 3·51	28	610
505	June 30·71	27	1133
506	July 27·91	27	578
507	Aug. 24·14	28	1207
508	Sept. 20·41	27	823
509	Oct. 17·69	27	288
510	Nov. 13·99	28	593
511	Dec. 11·31	27	864
512	1892 Jan. 7·64	27	1224
513	Feb. 3·98	24	1939
514	Mar. 2·32	27	843
515	Mar. 29·63	27	800
516	April 25·89	27	1361
517	May 23·12	27	1318
518	June 19·32	28	2042
519	July 16·52	27	1640
520	Aug. 12·74	27	1024
521	Sept. 8·99	28	1154
522	Oct. 6·27	27	782
523	Nov. 2·56	27	924
524	Nov. 29·87	27	847
525	Dec. 27·20	28	856
526	1893 Jan. 23·53	27	1571
527	Feb. 19·87	26	907
528	Mar. 19·20	28	1114
529	April 15·48	27	1342
530	May 12·72	27	1456

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
531	1893 June 8·92	26	1085
532	July 6·12	27	1574
533	Aug. 2·33	28	2383
534	Aug. 29·57	27	1802
535	Sept. 25·84	27	1411
536	Oct. 23·13	27	1197
537	Nov. 19·43	28	1514
538	Dec. 16·75	25	2119
539	1894 Jan. 13·09	27	1553
540	Feb. 9·43	28	1329
541	Mar. 8·76	27	933
542	April 5·06	27	1518
543	May 2·31	28	1870
544	May 29·53	27	2034
545	June 25·73	27	1695
546	July 22·94	27	1477
547	Aug. 19·16	28	736
548	Sept. 15·42	27	1266
549	Oct. 12·70	27	617
550	Nov. 9·00	28	773
551	Dec. 6·31	27	902
552	1895 Jan. 2·64	26	853
553	Jan. 29·97	28	991
554	Feb. 26·32	27	1114
555	Mar. 25·63	27	812
556	April 21·91	27	853
557	May 19·14	27	1280
558	June 15·34	28	963
559	July 12·54	27	833
560	Aug. 8·76	27	1135
561	Sept. 5·00	27	868
562	Oct. 2·27	28	1175
563	Oct. 29·56	27	851

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
564	1895 Nov. 25·86	27	787
565	Dec. 23·19	28	631
566	1896 Jan. 19·53	26	378
567	Feb. 15·87	28	1022
568	Mar. 14·20	26	584
569	April 10·49	28	205
570	May 7·73	27	301
571	June 3·95	27	783
572	July 1·14	27	576
573	July 28·36	27	209
574	Aug. 24·58	27	1195
575	Sept. 20·85	27	290
576	Oct. 18·14	28	794
577	Nov. 14·44	27	363
578	Dec. 11·75	27	795
579	1897 Jan. 8·08	28	1335
580	Feb. 4·43	26	817
581	Mar. 3·77	27	455
582	Mar. 31·07	28	391
583	April 27·33	27	364
584	May 24·55	27	268
585	June 20·76	27	289
586	July 17·96	27	647
587	Aug. 14·18	27	565
588	Sept. 10·43	28	423
589	Oct. 7·71	27	24
590	Nov. 4·00	27	32
591	Dec. 1·32	28	798
592	Dec. 28·64	27	422
593	1898 Jan. 24·98	28	528
594	Feb. 21·32	27	781
595	Mar. 20·64	27	150
596	April 16·92	27	229

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
597	1898 May 14·16	28	115
598	June 10·36	27	51
599	July 7·56	27	161
600	Aug. 3·77	26	437
601	Aug. 31·01	27	863
602	Sept. 27·28	28	553
603	Oct. 24·57	27	516
604	Nov. 20·87	26	247
605	Dec. 18·20	27	182
606	1899 Jan. 14·53	27	108
607	Feb. 10·87	27	36
608	Mar. 10·20	28	336
609	April 6·50	27	116
610	May 3·76	27	44
611	May 30·97	27	137
612	June 27·17	27	301
613	July 24·37	27	15
614	Aug. 20·60	27	2·1
615	Sept. 16·86	28	30
616	Oct. 14·14	27	81
617	Nov. 10·44	28	48
618	Dec. 7·76	27	51
619	1900 Jan. 4·09	27	63
620	Jan. 31·42	25	114
621	Feb. 27·77	26	136
622	Mar. 27·08	27	87
623	April 23·35	28	154
624	May 20·58	26	68
625	June 16·78	27	134
626	July 13·99	27	39
627	Aug. 10·20	27	23
628	Sept. 6·45	27	13
629	Oct. 3·72	28	159

TABLE I.—MEAN DAILY AREAS OF WHOLE SPOTS ON THE SUN'S DISC—*continued.*

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Views were taken.	Mean of Daily Areas of Whole Spots.
630	1900 Oct. 31·01	27	12
631	Nov. 27·32	28	0
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TABLE II.

MEAN DAILY AREAS OF WHOLE SPOTS FOR EACH YEAR.

Year.	No. of days of observation.	Mean Daily Area for each year.	Year.	No. of days of observation.	Mean Daily Area for each year.
1832	211	274	1867	124	131
1833	217	60	1868	163	434
1834	210	133	1869	191	972
1835	149	773	1870	197	2761
1836	158	1331	1871	206	2004
1837	144	1170	1872	94	1462
1838	195	903	1873	114	766
1839	182	780	1874	159	601
1840	246	586	1875	161	272
1841	257	348	1876	162	122
1842	281	254	1877	168	92
1843	280	95	1878	342	19
1844	273	171	1879	293	30
1845	220	419	1880	363	402
1846	215	626	1881	346	679
1847	222	1021	1882	343	1002
1848	231	986	1883	340	1155
1849	220	765	1884	315	1079
1850	224	494	1885	354	811
1851	224	683	1886	363	381
1852	270	545	1887	361	179
1853	232	436	1888	359	89
1854	156	113	1889	360	78
1855	217	64	1890	361	99
1856	211	49	1891	363	569
1857	226	201	1892	362	1214
1858	118	714	1893	362	1464
1859	70	1404	1894	364	1282
1860	175	1172	1895	364	974
1861	234	1258	1896	364	543
1862	165	1363	1897	364	514
1863	170	702	1898	363	375
1864	156	784	1899	364	111
1865	157	407	1900	360	75
1866	145	318			

Description of Plates I. and II.

The results given in the tables are shown graphically in the plates appended. In each case dates are represented on the horizontal scale, and the ordinates represent the mean daily areas in millionths of the sun's visible hemisphere. Plate I. indicates the variations of spotted area in successive rotation periods, and Plate II. the variations for each year. The lines marking the times of maxima and minima in Plates I. and II. are placed at points determined from a smoothed curve in which the ordinates were determined as follows:—The whole period was divided up into periods of five rotations, and the mean daily area for each calculated; each mean thus derived was combined with the two adjacent to it on each side, and the mean thus obtained formed the ordinate for the middle of the period.

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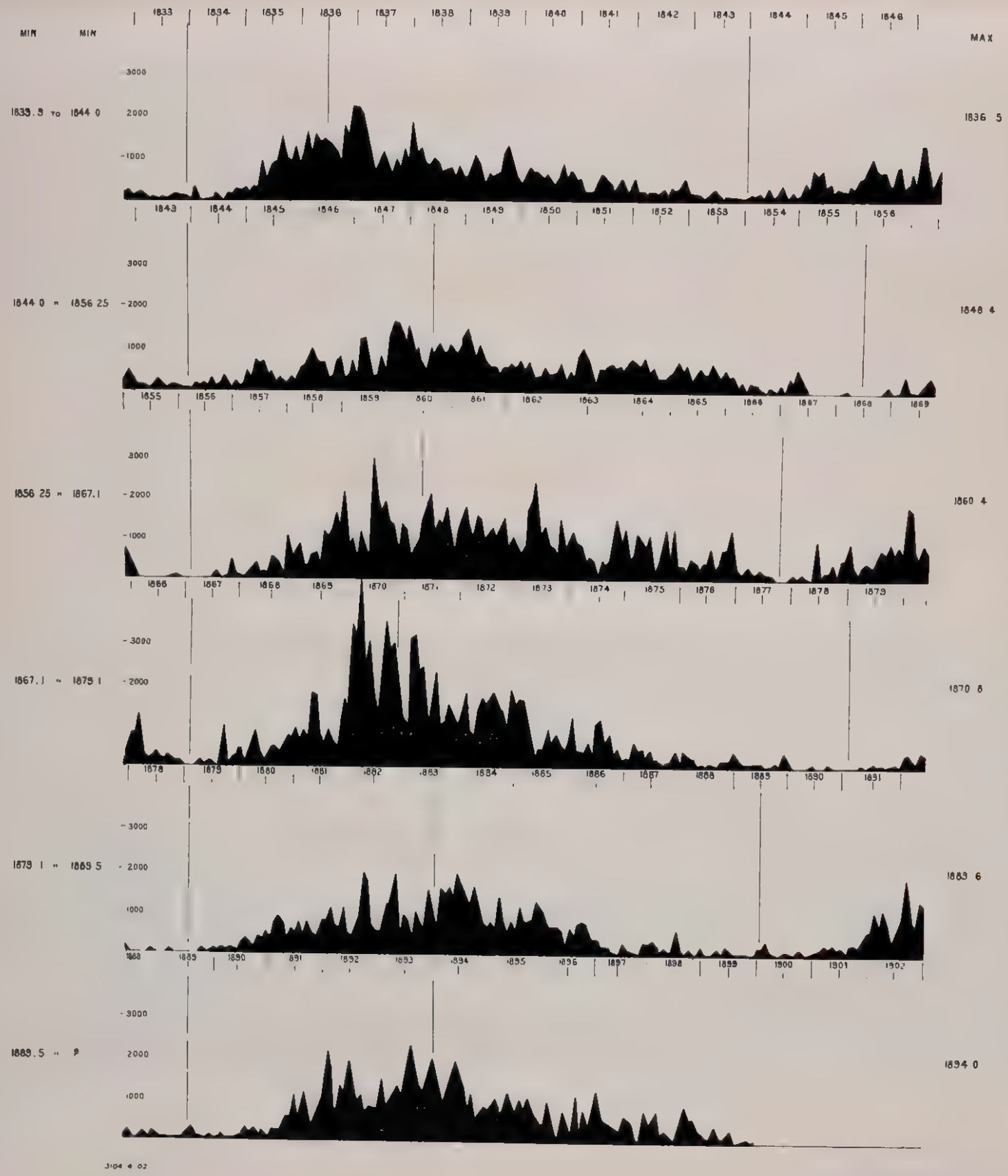
Plate 1.

SUN'S SPOTTED AREA 1832 – 1900.



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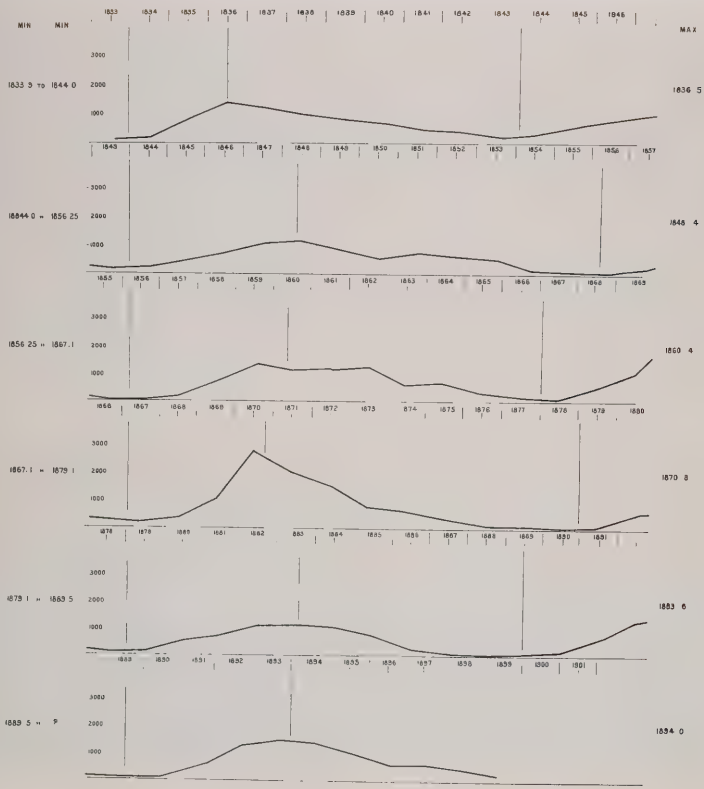
SUN'S SPOTTED AREA.

MEAN OF DAILY AREAS FOR EACH YEAR 1832 1900



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